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To the London Medical
Society from the
Author.

18th Feb 1861
Dear Sir
I have the honor to acknowledge
the receipt of your letter of the 14th inst.

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VIEWS

OF THE

from the Author

BASIS OF THE BRAIN AND CRANIUM,

ACCOMPANIED WITH OUTLINES,

AND

A Dissertation on the Origin of the Nerves,

INTERSPERSED WITH SURGICAL OBSERVATIONS.

BY T. J. PETTIGREW.

LONDON:

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— 00000 —
1809.

DEDICATION.

TO

JOHN TAUNTON, ESQ.

MEMBER OF THE ROYAL COLLEGE OF SURGEONS,

SURGEON TO THE CITY & FINSBURY DISPENSARIES,

CITY TRUSS SOCIETY,

AND

LECTURER ON ANATOMY, SURGERY, &c.

Dear Sir,

Impressed with the deepest sense of gratitude for a long series of kindness and attention, I embrace this opportunity of publicly expressing my unfeigned acknowledgments, and offering to you the first fruits of those studies which originally commenced, and gradually improved, under your obliging patronage and protection.

Anxious to shield my production under a name so truly respectable in the Profession as yours, I hope you will pardon the liberty which I take in prefixing it to these pages, and peruse with indulgence my well meant efforts to elucidate a very intricate, but highly important subject. Wishing you uninterrupted happiness, and a long enjoyment of those honours to which your virtue and talents so justly entitle you,

I remain, Dear Sir,

Your most obliged and obedient Servant,

THOMAS JOSEPH PETTIGREW.

Fleet Street, Oct. 1809.

INTRODUCTORY OBSERVATIONS.

THE BRAIN is that substance, which with its **MENINGES** or **MEMBRANES** form the contents of the Cranium.

Its Membranes are by the generality of modern Anatomists enumerated three; **Dura Mater**, **Tunica Arachnoides**, and **Pia Mater**.

It is by these the Brain is surrounded and defended from any injury it otherwise might be liable to receive from the acute terminations of the various processes of the Cranium.

DURA MATER, the external one, composed of two **Laminae**, forms the internal periosteum of the Cranium, the vessels of which inosculate *ad infinitum* with those of the external periosteum and integuments: it is by this most minute inosculature of the internal and external vessels so much advantage is derived by taking blood from the Temporal Arteries in cases of Phrenitis, Concussion, &c.

The **DURA MATER** is no where adherent to the **PIA MATER**, excepting in the course of the superior longitudinal sinus, it lines the foramina of the Cranium, and also by its protraction forms a covering to all the nerves arising from the **SENSORIUM**.

This Membrane gives off some very extensive processes for the purpose of preserving the Brain *in situ naturale*, preventing one part compressing another in the various inclinations of the Head.

These are, the **FALX MAJOR seu PROCESSUS LONGITUDINALIS SUPERIOR**, extending from the **CRISTA GALLI** of the **OS ETHMOIDES** in the direction

of the sagittal suture to the superior ramus of the crucial spine of the Os OCCIPITIS.

The FALX MINOR *seu* PROCESSUS LONGITUDINALIS INFERIOR, extending from the FALX MAJOR along the inferior ramus of the crucial occipital spine, and terminating very minutely at the FORAMEN MAGNUM, dividing the CEREBELLUM into two LOBES: this is usually called the SEPTUM CEREBELLI.

The TWO LATERAL or PROCESSUS TRANSVERSI, extending from the Petrous portions of the Temporal bones along the lateral rami of the crucial spine, forming together what is denominated TENTORIUM CEREBELLI SUPER. EXTENSUM. This completely covers the Cerebellum and supports the Posterior lobes CEREBRI.

The Second or TUNICA ARACHNOIDES (so called from the Greek word *αράχνη* a *spider* and *ειδος* form, in reference to its resemblance to the spider's web). It intervenes between the Dura and Pia Mater, and some Anatomists consider it as a layer of the latter.*

The TUNICA ARACHNOIDES is perfectly transparent, and so exceedingly fine as to cause impossibility of demonstration on the superior surface: but in the basis very plainly seen.

The Third, or PIA MATER, is the membrane actually investing the Brain, forming so complete a covering, and with such intimate connection, that it even follows the course of its intergyral spaces, in which situation it is distinguished by the name of *Tomentum Cerebri*: It is the most vascular of the membranes, and its veins terminate in the superior longitudinal sinus, which are the only points of communication between it and the Dura Mater.

* Winslow was of this opinion, for when treating of the Membranes of the Brain, he observes, "The Meninges or Membranes are two in number, one of which is very strong, and lies contiguous to the Cranium; the other is very thin, and immediately touches the Brain. The first is named Dura Mater; the second Pia Mater, which is again divided into two, the external Lamina being termed Arachnoides; the internal retaining the common name of Pia Mater."

Winslow's Anatomy, 2d Vol. p. 234, 5th Edition.

OF THE BRAIN.

THE BRAIN consists of three distinct parts; which from their appearance have been denominated SUBSTANTIA CORTICALIS, SUBSTANTIA MEDULLARIS, et SUBSTANTIA NIGRA.

The CORTICAL, or Cineritious part, which is the most vascular, and of an ash-coloured appearance, is situated externally, and is least in quantity in the Cerebrum; it surrounds the Medullary matter, and is continued along the whole of the external surface of the Cerebrum and Cerebellum.

The MEDULLARY is a white mass placed internally; from which all the nerves derive their origin.

The SUBSTANTIA NIGRA is a dark coloured part situated in the Crura Cerebri.

DIVISION OF THE BRAIN.

THE Brain is divided into three Parts: Cerebrum, Cerebellum, and Medulla Oblongata.

The CEREBRUM is all that part of the Brain seen upon removing the Calvaria, extending from the anterior to the posterior part of the Cranium, separated into two Hemispheres by the Falx major, each of which is divided into three lobes, contained in *fossæ* adapted to their reception in the Basis of the Cranium,* and are named from their position Anterior, Middle, and Posterior.

The ANTERIOR LOBES are supported by the orbital processes of the Os Frontis, and the Alæ Minores of the Os Sphænoides.

* The *fossæ* will be particularly seen in the Plate of the Basis of the Cranium.

The MIDDLE LOBES are situated in the fossæ cerebrales formed by the junction of the Ossa Temporum and the Os Sphænoides.

The POSTERIOR LOBES are protected posteriorly by the superior fossæ of the Os Occipitis resting upon the Tentorium.

The CEREBELLUM lies beneath the Transverse Processes of the Dura Mater which protects it from pressure of the Cerebrum.

It is divided into two Lobes which are situated in the inferior depressions of the Os Occipitis.

In the Cerebellum, the Substantia Medullaris is very small in quantity, forming a most beautiful appearance, very distinctly shown by a vertical section called by Anatomists ARBOR VITÆ.

The Cerebrum and Cerebellum viewed externally possess very different appearances; the former having a convoluted, the latter a striated surface.

The MEDULLA OBLONGATA is an oblong body situated on the cuneiforme or basilar process of the Os Occipitis; it is merely a continuation of the medullary substance of the Brain before its exit through the Foramen Magnum of the Os Occipitis, after which it takes the name of Medulla Spinalis, continuing through the *specus vertebrarum* until its termination upon the Os Sacrum, where it is denominated CAUDA EQUINA.

On the inferior surface of the Medulla Oblongata, there are six Eminences: two situated anteriorly, and from their figure have derived the name of Corpora Pyramidalia¹; two placed on the sides of this part, and termed, from their resemblance to olives, Corpora Olivaria², and two smaller situated laterally to the Corpora Pyramidalia, and posteriorly to the Corpora Olivaria, called Corpora Pyramidalia Lateralia.

¹ The Corpora Olivaria of Winslow.

² The Corpora Pyramidalia of Winslow.

OF THE NERVES.

The Nerves arising from the Brain are nine Pair, named numerically, as well as from their situation and use, as follows:

- The First Pair; or Nervi Olfactorii.
- Second Pair; or Nervi Optici.
- Third Pair; or Nervi Motores Oculorum.
- Fourth Pair; or Nervi Pathetici.
- Fifth Pair; or Nervi Trigemini.
- Sixth Pair; or Nervi Abducentes.
- Seventh Pair; or Nervi Auditorii.
- Eighth Pair; or Nervi Vagi.
- Ninth Pair; or Nervi Motores Linguae.

Some Authors reckon ten Pair of Nerves originating from the Brain, they then include the Sub-Occipital, which I am inclined to consider as the first cervical.

Others have accounted eleven Pair, considering the Spinal Accessory and Sub-Occipital Nerves as belonging to the Brain; but as they derive their origin *decidedly* from the Spinal Marrow, ought to be classed with the Nerves originating from the Medulla Spinalis.

NERVI OLFACITORII.

The first Pair, or Nervi Olfactorii, arise each by three distinct bands: 1st, from the Corpus Striatum¹; 2d, from the Medulla of the anterior lobe of the Cerebrum; and, 3d, from the anterior and inferior part of the Corpus Callosum.²

These nerves pass forward rather converging on the inferior part of the anterior lobe Cerebri to which they are firmly attached, towards the cribriform plate of the Os Ethmoides, where they expand; they then send off a great number of filaments which pass through the foramina cribrosa, and extend themselves by innumerable ramifications over the Schneiderian or Pituitary membrane of the nose, and the superior turbinated bones constituting the organ of smell. The nerve has never been traced to the inferior turbinated bones, but without doubt the spongy appearance of them is produced by its minute filaments.

¹ The Corpora Striata are two convex bodies of a pyriform shape, and of a striated appearance, placed anteriorly and externally in the lateral ventricles, which are two cavities in the Brain seen by making an oblique section beginning anteriorly half an inch from the raphè, extending to an inch posteriorly. It is difficult to say where the Corpora Striata terminate, they resolve themselves into the medullary substance, so that perhaps the whole three branches by which the Olfactory nerves take their origin may be derived from them alone.

² The Corpus Callosum is a white medullary substance, rather convex, marked in the centre with a line called the raphè, which may be seen by separating the hemispheres of the Cerebrum; it is a continuation of the medulla of one side of the Brain extending to the other; likewise upon it may be observed transverse striæ called Lineæ Transversæ Vicussenii.

Is it not probable that the raphè is formed by the pulsation of the Arteriæ Callosæ situated on each side of it?

NERVI OPTICI.

The second Pair, or Nervi Optici, arise by two bands, one on each side, named Tractus Opticus, from the posterior part of the Thalamus Nervi Optici³.

These Nerves pass onwards to the Crura Cerebri⁴, inclining to each other, towards the Eminentiae Candicantes⁵ and Infundibulum⁶, where they unite (it has been supposed decussate) rather anterior to the Sella Turcica, on the Processus Olivarius of the Os Sphænoides; they then diverge and take their course through the foramina optica (lying in a groove in those openings) into the orbits, and are inserted into the globe of the eye, not in the centre, but nearer to the nose, when they expand and form the inner coat of the eye called *retina*, upon which the images of objects are represented⁷.

This nerve* is perforated by an artery which in the Fœtus continues on and passes through the Vitreous Humour, this is called Arteria Centralis Retinæ: It, after birth, becomes obliterated at the retina, which precise point is termed *Porus Opticus*.

These nerves constitute the organ of sight.

The Retina is subject to a variety of diseases or defects, producing either confused or total absence of vision⁸.

³ The Thalami Nervorum Opticorum are two white oval bodies situated between the posterior parts of the Corpora Striata.

⁴ The Crura Cerebri are two processes of the Medullary substance of the Brain assisting in the formation of the Pons Varolii or Tuber Annulare.

⁵ The Eminentiae Candicantes, or Corpora Albicantia, are two small white oval bodies lying behind the Infundibulum, divided by a fissure.

⁶ The Infundibulum is a passage leading from the anterior and inferior part of the third ventricle down to the pituitary gland, which lies in the sella turcica of the Os Sphænoides.

⁷ Winslow did not consider the retina an expansion of the Optic nerve.

* I beg leave to observe, in apology for my deviation from grammatical propriety, that for the sake of precision, or where it admits of more explicit definition, that I have used a description of one nerve only, though under the head of the plural number.

⁸ For a full description of them and their different species, see Rowley's *Pract. of Physic*, Vol. 3.

Too exquisite a sensibility of the retina produces an incapability of enduring the irritation occasioned by the rays of light, and is called Photophobia.

Paralysis of the Optic nerve produces blindness, generally attended with a dilated and immoveable pupil, known by the name of Amaurosis, or Gutta Serena.

It sometimes occurs that only part of the retina becomes paralytic, it then consequently produces only partial privation of vision, and is denominated Hemiopsia.

It not unfrequently happens that the retina becomes partly insensible, and that from this diminution of sensibility, Amblyopia, or partial vision, unattended with any external visible alteration of the eye, is the consequence.

NERVI MOTORES OCULORUM.

The third Pair, or Nervi Motores Oculorum, arise from the Crura Cerebri, near the Pons Varolii⁹, they approach towards the Eminentiae Candicantes where they separate, they then perforate the Dura Mater anterior to the anterior clinoid processes of the Os Sphænoides, and pass forward through the Foramina Lacera Superiora, or orbital fissures.

In the orbit, it gives off filaments to the Ganglia Lenticularis *seu* Ophthalmica, and is distributed to five muscles of the eye: three Recti, viz. Levator, Depressor et Adductor, the Levator Palpebræ Superioris et Obliquus Inferior.

⁹ At the Basis of the Brain are situated four Crura, two of which arise from the Cerebrum, and two from the Cerebellum, these crura unite, and form a body which has a striated surface, and is termed the Pons Varolii, from which several nerves arise. It is likewise called Nodus Cerebri.

NERVI PATHETICI.

The fourth Pair, or Pathetici, called by some Anatomists Trochlearis.

These are the smallest nerves of the brain, and arise from the posterior part of the Testes, or inferior bodies of the Tubercula Quadrigemina¹⁰.

This Nerve passes on the side of the Pons Varolii, and perforates the Dura Mater, under the clymoid processes of the Os Sphænoides, then takes its course through the Foramen Lacerum, accompanying the third pair into the orbit, to be appropriated to the Musculus Trochlearis seu Obliquus superior, whose use is to roll the eye, and move the pupil downwards and outwards.

This nerve gives off some twigs, which communicate with the first branch of the fifth Pair, or Nervus Ophthalmicus.

In dissection, these nerves may always be distinctly seen beneath the anterior portion of the Tentorium. It is thought debility of this nerve frequently produces *Strabismus*.

NERVI TRIGEMINI.

The fifth pair, or Trigemini, are the largest nerves of the Brain, arising from the Pons Varolii at those parts where the Crura Cerebelli enter it. It is said more particularly to originate by two portions, the anterior by fibres from the Pons Varolii, and the posterior from the Crura Cerebelli; these two parts are connected together by the Pia Mater.

¹⁰ The *Tubercula Quadrigemina* are four small round bodies situated posteriorly to the third ventricle; upon these the *pineal gland* rests. The two superior are called the *Nates*, the two inferior the *Testes*, though improperly, for they bear no resemblance to the parts from which they are named.

The nerve passes to the Processus Petrosus of the Temporal Bone, where it, somewhat anteriorly, perforates the Dura Mater, beneath which, in the posterior part of the fossa Cerebralis (which supports one of the middle lobes of the Cerebrum), it forms an enlargement of an oblong figure apparently depressed; this is called the Ganglion Gasseri.

Some filaments are by many Anatomists said to be given off from this part supplying the Dura Mater. From this Ganglion proceed three branches, whence the name of Trigemini.

1. Ophthalmic¹.
2. Superior Maxillary.
3. Inferior Maxillary.

They are also distinguished by the names of Anterior, Middle, and Posterior.

The first Branch, or Ophthalmic, takes its course beneath the Dura Mater; where it gives off filaments to assist in forming the great sympathetic nerve; it then passes through the Foramen Lacerum Superius into the orbit. Its ramifications are thence thus distributed and distinguished:

- 1st, The Supra Orbitary, or Frontalis.
- 2d, The Nasalis.
- 3d, The Lachrymalis.

The first Branch Supra Orbitary, or Frontalis, perforates the Periosteum at the superior part of the Orbit, and escapes by the Foramen Superciliaris, *vel* Supra Orbitale². It then expands on the Os Frontis, supplying the Musculus Corrugator Supercilii, Orbicularis Palpebrarum et Occipito Frontalis seu Epicranius, with the integuments. It ramifies over the Head, and may be traced connected with the sub-occipital ramus of the second Cervical.

¹ The Nervus Orbitarius of Winslow.

² This is in most instances merely a notch.

This nerve is sometimes affected with Tic Douloureux, and prompted by the flattering success resulting from the division of nerves thus diseased, I have endeavoured to lay down an almost invariable rule to accomplish it to a certainty, upon all those ramifications of nerves superficially situated. This branch (the Supra Orbital) escapes about an inch from the centre of the Nose, so that an incision made immediately upon the superciliary ridge, elevating the Eye Brow about half an inch, will not fail to divide the nerve, and it is fortunately ascertained that this operation produces only temporary inconvenience, the numbness ceasing in a short time. The nerve thus must become reunited, and the Patient happily secured from relapse*.

The second Branch, or Ramus Nasalis, passes through the Foramen Orbitarium Internum Anterior of that part of the transverse suture formed by the Ethmoid and Frontal bones, ascends up through the Cribriform plate of the Ethmoid Bone, passes round the Crista Galli, and out again by a large foramen, in the interior part of the Cribriform process, and continuing beneath the Ossa Nasi, ramifies to the tip of the nose.

This ramus supplies the internal angle of the eye, and gives off, previous to its entering the Foramen, a branch in the direction of the Angular artery, to supply the Alæ Nasi externally.

* Some few deviations are recorded of a recurrence of the disease, where the Nerve *has* been divided, but these bear a small proportion to the number of its success. Dr. S. Fothergill (who entitles this disease *Faciei morbus nervorum crucians*) relates that he has heard of four cases in which the operation has succeeded. One of them occurred *ten years* ago, and the Patient has experienced no return of symptoms.

The Tic Douloureux is a disease of such excruciating pain, and the operation of dividing the nerve so simple, that I think the Surgeon warranted to have recourse to his Scalpel in most cases. The only relief that has been obtained to Patients suffering under this malady, has been from the knife,—no medicines with which we are yet acquainted are of the least effect.

I remember having read (I believe in the *Edinbro' Medical and Physical Journal*) of a case of Tic Douloureux which terminated favorably by the respiring of nitrous oxyd. Such a remedy is certainly deserving of trial.

This nerve, in the Orbit immediately after dividing from the Ophthalmic, gives off branches to form with those from the Motores Oculorum, the Lenticular Ganglion. This is an enlargement of nervous substance situated on the outside of the Optic Nerve.

From it arise the Ciliary nerves, which perforate the Choroid coat, and extend even to the Iris.

The third Branch, or Ramus Lachrymalis, runs along the outer side of the Orbit, and is appropriated chiefly to the Glandula Lachrymalis, from whence it derives its name.

The second Branch of the Trigemini, called Superior Maxillary, passes through the Foramen Rotundum of the Os Sphænoides, and behind the Tuberosity of the Superior Maxillary Bone it forms an enlargement, called from its discoverer Ganglion Meckeli, here it divides into three branches, viz.

- 1st, Sphæno-Palatine.
- 2d, Palato Maxillary, *seu* Pterigo Palatina.
- 3d, Infra Orbitaly.

The first Branch, or Sphæno Palatina, passes through the Foramen Sphæno-Palatinum, an opening situated at the posterior part of the tuberosity of the Superior Maxillary bone, formed by the Orbital processes of the Palatine bone anteriorly, and the Pterygoid processes of the Sphænoid bone posteriorly. In its course, it gives off a branch posteriorly called the Viduan nerve, which going through the Foramen Sphæno-Pterygoideum, commonly called Canalis Viduanis, sends a ramus through the Canalis Carotideus, to assist in forming the Sympatheticus Maximus.

Another ramus passes through the Foramen Innominatum of the Processus Petrosus Ossis Temporalis, which uniting in the internal organ of hearing, with a branch of the Portio Dura of the seventh Pair,

escapes by the Fissura Gasseri¹, and is then denominated Chorda Tympani; this with a branch of the inferior maxillary forms the gustatory nerve. The Sphæno-Palatine then continues, and supplies the Posterior Nares, Pituitary Sinuses, &c. and ramifying over the basis of the Nares, sends a branch through the Foramen Incisorum, behind the central Incisores, which communicates with the

SECOND, OR PTERYGO-PALATINE BRANCH. This passes through the Pterygo Palatine Canal (which is formed by the Palatine Bone, and Pterygoid processes of the Os Sphænoides) and escapes upon the roof of the Mouth by the Foramen Palatinum Posticum: It ramifies upon the Palate, supplying the Velum Pendulum, the Uvula, and the superior Teeth, and is connected as above-mentioned with the Sphæno-Palatine.

The third Branch, or Infra Orbitaly, passes up through the Foramen Lacerum Inferior, or Sphæno-Maxillary Fissure, then proceeding through the Canalis Infra Orbitalis, escapes upon the Face by the Foramen Sub Orbitale. It anastomoses with the Nervus Communicans Faciei, *seu* Pes Anserinus.

This is the nerve upon which the first attempt of relieving Tic Douloureux was made, and great honour is due to Dr. Haighton for his unwearied endeavours to assist patients suffering under this most painful malady.

The Infra Orbital foramen is situated about a quarter of an inch from the inferior margin of the orbit, and in a direct line beneath the Malar suture, which may very distinctly be felt by the finger, so that an incision with a sharp pointed knife made directly down to the bone, half an inch from the margin, and beneath the Malar suture, half an inch in length, cannot fail completely to divide the nerve.

¹ The Fissura Gasseri is situated in the Glenoid cavity of the Temporal Bone, dividing the fossa parotidea from the fossa articularis.

The THIRD BRANCH OF THE TRIGEMINI enters the Foramen Ovale of the Os Sphænoides, and after it has passed through that opening bifurcates, one branch forming the Gustatory nerve, the other the true Inferior Maxillary.

The Gustatory branch being joined by the Chorda Tympani, which escapes by the Fissura Gasseri, runs over the Pterygoid muscles, takes its course through the Tongue, and then ramifies very minutely upon the Papillæ and Tip.

The true Inferior Maxillary passes beneath the Pterygoid muscles, from the pressure of which it is protected by a Spinous process situated at the Foramen Maxillarium Posticum: Before the nerve proceeds through this foramen, it gives off a ramus, passing in a sulcus behind the Spinous process of the Inferior Maxillary Bone, beneath the Mylo-Hyoideus, which muscle it supplies, and also the sub-lingual and maxillary salivary glands.

The Nerve continuing through the Inferior Maxilla by the Canalis Mentalis, gives a branch to each Tooth, and then emerges on the Lower Lip by the Foramen Maxillarium Anticum, anastomosing with the Pes Anserinus.

This nerve being *also* liable to Tic Douloureux may be divided by making an incision, half an inch in length, one inch from the Symphysis, and half an inch from the Basis of the Jaw, but in Patients whose Teeth are perfect, immediately under the second Bicuspid.

By the numerous inosculation of the branches of the fifth Pair, we are enabled to account for the sympathy existing between the Face, Ear, and glands of the Neck, when the Teeth are affected.

NERVI ABDUCENTES.

The sixth Pair, Abducentes or Motores Externi, arise from the Medulla Oblongata, between the Corpora Pyramidalia et Pons Varolii. The fibres of these nerves at their origin possess great variety, scarcely ever arising in two subjects from exactly the same point; indeed so much so, that almost all Anatomists vary in their description, but from the appearance of numerous dissections, I am led to the conclusion, that its most general origin is the above-mentioned point.

This nerve passes beneath the Pons Varolii, perforates the Dura Mater behind the posterior clynoïd process, passes through the cavernous sinus between the Ophthalmic Nerve and Carotid Artery, where it gives off several filaments, passing through the Canalis Caroticus, and forming with the reflected ramus of the Sphæno-palatine (usually called the Viduan nerve) the Nervus Sympatheticus Maximus:

The Trunk of the nerve is continued through the Foramen Lacerum superior to be finally distributed to the Abductor muscles of the eye. It is supposed by a justly celebrated modern Anatomist, that the contiguous situation of this nerve to the Carotid Artery is the principal cause of giddiness and uneasiness of the eyes in cases of intoxication, the pulsation being so strong as to produce violent irritation on the nerve.

NERVI AUDITORII.

The seventh Pair, or Nervi Auditorii, are next in size to the Trigemini, composed of two distinct portions, one situated anteriorly, denominated Portio Dura, seu Nervus Communicans Faciei, the other Portio Mollis seu Nervus Accousticus, belonging to the internal organ

of hearing, and consequently constituting the true Auditory Nerve. This last portion is the greatest in quantity.

It is stated, and may very easily be demonstrated, that there are fibres situated between the two portions; the filaments of these intermediate fibres terminate in the anterior portion, or that named Dura, so that perhaps it may with some degree of propriety be deemed one of the origins of that part of the seventh Pair. WRISBERG was the first Anatomist who described them.

The Portio Dura arises from the Crura Cerebelli and Pons Varolii laterally, and rather inferiorly; it partly lies in a groove on the anterior part of the Portio Mollis, and in a lateral direction perforates the Dura Mater; it then passes into the foramen communis nervorum, *seu* foramen auditorii internum of the Processus Petrosus of the Temporal Bone; it takes its course through the largest opening in the fossula parvula¹, and then gives off a ramus to unite with a branch of the Viduan nerve (which enters by the foramen innominatum) to form the Chorda Tympani going to supply the Membrana Tympani passing between the incus and malleus, and which branch inosculates with the gustatory branch of the Inferior Maxillary as before-mentioned. By the connection of this branch with the inferior maxillary, we become acquainted with the reason why sharp acute sounds have that effect on the teeth known commonly by the phrase of *setting them on edge*.

The nerve (Portio Dura) continues through the AQUEDUCTUS FALLOPII, and escapes by the *foramen stylo-mastoideum*, perforates the

¹ By looking into the foramen communis nervorum, we find it divided by a Spinous process into two fossulæ, the fossula parvula being situated superiorly, the fossula magna inferiorly. In the fossula parvula, or superior fossula, there is a foramen larger than the other openings, through which the Portio Dura passes. Through the remaining foramina in the fossula parvula et magna, the fibres of the Portio Mollis are continued.

Parotid Gland, which it supplies and ramifies most minutely upon the face, anastomosing with the Infra Orbital Inferior Maxillary, and the ramus auricularis of the third Cervical. From the manner in which it expands, its extreme branches in the aggregate have been termed *Pes Anserinus*, distributing branches to the posterior part of the Ear, styloid muscles, and parts adjacent.

The Portio Dura is sometimes affected with *Tic Douloureux*, and the branches of it have frequently been cut down upon, but from the intricate inosculation of it, no good has been derived; the only way to insure success would be to cut through the Parotid Gland, and divide the Portio Dura as it comes out of the stylo-mastoid foramen. This is nearly impracticable.

The Portio Mollis, *seu* Nervus Accousticus, supplies the internal organ of hearing, and forms the true auditory nerve.

It arises by transverse medullary striæ from the *crena* of the *calamus scriptorius* of the fourth ventricle, passes through the substance of the brain, and escapes contiguous to the Portio Dura, which it accompanies to the *foramen communis nervorum*, gives off branches, passing through all the foramina of the *fossula magna*, and the remaining ones in the *fossula parvula*, to be distributed to the lamina spiralis of the cochlea, the vestibulum, where it is called *BARBULA*, and through the semicircular canals, where it is denominated *AMPULLÆ*.

NERVI VAGI.

The eighth Pair, or Nervi Vagi¹, arises by several branches posteriorly and laterally, from those eminences situated on the Medulla Oblongata, called Corpora Olivaria.

Before the nerve makes its exit from the Cranium, it gives off a branch denominated Glossopharyngeus, which passes through a different foramen of the Dura Mater, anterior to the one which the Par Vagum enters; they however escape by the same opening from the Cranium, namely the Foramen Lacerum Posticum² vel Foramen Jugale, accompanied by the Nervus Accessorius Spinalis Willisii (of which I shall treat presently), and the termination of the Lateral Sinus to form the Internal Jugular Vein. The Glosso-Pharyngeus passes down by the Stylo-pharyngeus muscle, and sends off branches to supply the styloid and digastric muscles; it likewise communicates with the branches of the Par Vagum.

These branches uniting form a small ganglion, which sends off filaments to the muscles of the pharynx. It then continues, and giving off branches to supply the muscles attached to the tongue according to their situation, have acquired the names of rami linguales profundi, rami linguales laterales, &c.

The Par Vagum, having passed through the foramen lacerum superior, descends down the neck, where it lies in a triangular space. The Carotid Artery is situated on the outside of it, and the Internal Jugular Vein rather anterior to it. These three parts, namely Carotid Artery, Par Vagum, and Internal Jugular Vein, are enclosed in a sort

¹ The Nervi Sympathetici Medii of Winslow.

² It is said by a modern Anatomist, that the Glosso-Pharyngeus, in many subjects, passes through a different osseous opening. I have never seen it.

of sheath formed by cellular substance. In its course down the neck it gives off some small branches to the Pharynx, and one to the superior cervical ganglion formed by the Sympatheticus Maximus; it likewise gives off branches to the Larynx, forming the Laryngea Externi, and the Ramus Laryngeus Internus, which is a large branch, and enters the Larynx accompanied by the Arteria Laryngea Interna, between the Os Hyoides and Thyroid Cartilage, to supply the internal organ of voice. It distributes filaments likewise to the Thyroid Gland and parts adjacent.

The Par Vagum anastomoses with the Portio Dura of the seventh Pair, the glosso-pharyngeal, spinal accessory and superior cervical, in a very intricate manner. The Nerves then pass down into the Thorax, where they give off the *rami recurrentes*; these branches ascend, the left passing round the Aorta, and the right behind the Arteria Innominata, or sometimes the Subclavian, they ascend by the side of the Œsophagus, supplying it with branches named Œsophageal, and the Trachea, Thyroid Gland, and the whole of the external organ of voice. The Par Vagum being now situated in the Posterior Mediastinum, along with the Œsophagus (the right nerve running behind, and the left before it) they form the right and left Pulmonic plexuses, which supply the lungs, and assist in forming the Cardiac plexus, which is distributed to the heart.

Still accompanying the Œsophagus, they pass through the foramen sinistrum of the Diaphragm, and corresponding to the Cæliac artery, they form, by their junction with the Splanchnic nerve, the SEMI-LUNAR GANGLION.

From this ganglion proceed plexuses to correspond with the Arteries of the Aorta, supplying with them their proper parts, as the Gastric or Stomachic appropriated to the Stomach, the Hepatic to the Liver,

the Splenic to the Spleen. Descending to the superior Mesenteric supplying the Mesentery and small Intestines, Renal plexuses to the Kidneys, Spermatic plexuses to the Testicles in the Male, and the (in common with branches from the Spinal Marrow) Ovaries in the Female, Inferior Mesenteric to the Meso-Colon and large Intestines, and ultimately the Lumbar plexuses corresponding to the Lumbar arteries. These are also denominated Hypogastric.

All these arising from the semilunar ganglion, in the aggregate have been named the Solar Plexus.

NERVUS ACCESSORIUS SPINALIS WILLISII.

The Spinal Accessory nerve arises within the *Theca*, from the superior part of the Medulla Spinalis, ascends through the foramen magnum occipitale, is attached to the Par Vagum, and passes through the same opening, perforates the stylo-mastoideus muscle posteriorly, and is distributed by numerous ramifications to the integuments and muscles of the back and neck. It *anastomoses* with the superior cervicals.

NERVI MOTORES LINGUÆ¹.

The ninth Pair, Nervi Linguales, Hypoglossi or Motores Linguæ, arise by two distinct bundles of fibres from betwixt the Corpora Olivaria and Corpora Pyramidalia of the Medulla Oblongata.

These fibres unite, and pass out of the Cranium through the anterior Condylloid foramina, take their course down the neck, anastomosing with the Par Vagum, Accessory Spinal, and the two superior Cervical

¹ I am induced to adopt this name in preference to any that have been before ascribed to it, conceiving it more appropriate, the nerves being distributed to the muscle of the tongue which it puts in motion.

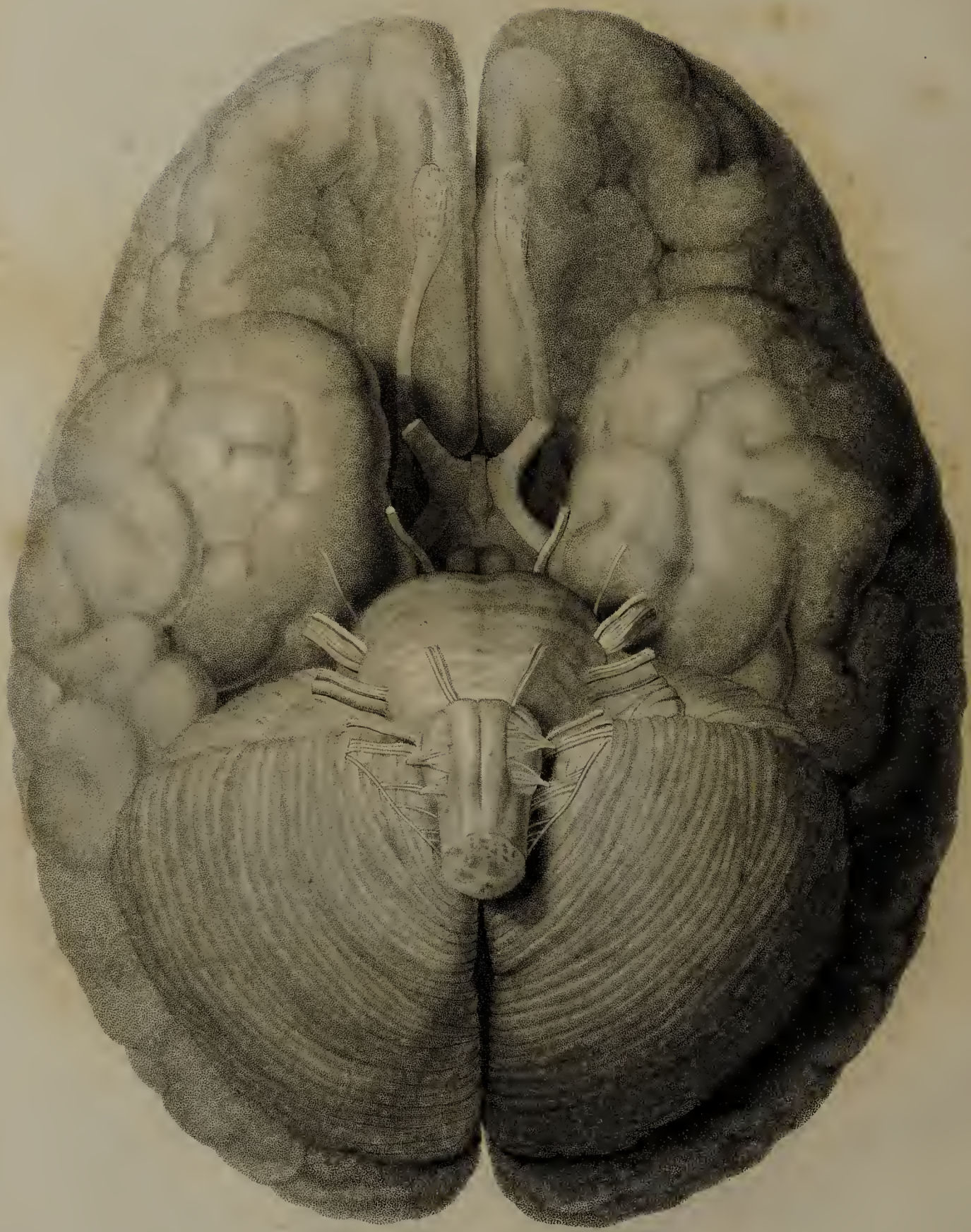
nerves; the nerve then passes between the Jugular Vein and Carotid Artery, when it sends off an extremely fine delicate branch called the *DESCENDENS NONI*. This twig is distributed to some of the muscles of the neck, and to the fore part of the *Trachæa*.

The trunk of the nerve is continued over the Carotid Artery, crossing the Facial Artery over the Hypoglossus muscle, and is appropriated to the muscles of the Tongue.

NERVI SUB-OCCIPITALES.

The Sub-Occipital Nerves, or tenth Pair, arising from the Brain, as some authors consider them, take their origin by two, or sometimes three, branches from the superior part of the *Medulla Spinalis*, pass out directly opposite to their origin between the first vertebra and occiput, and divide into several filaments which supply the muscles of the neck and back.

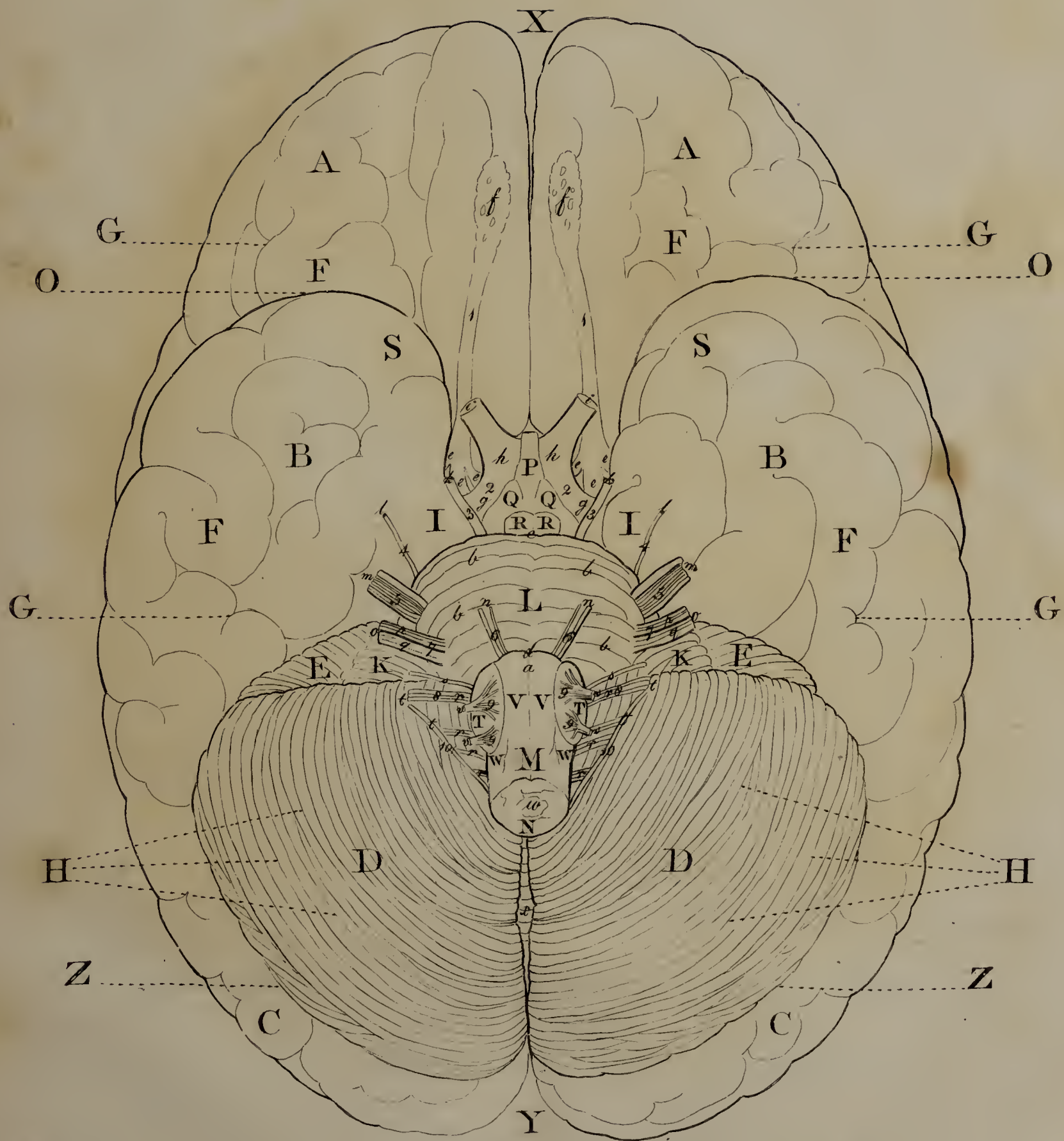
FINIS.



T. Baxter del ad nat.

T. L. Pettigrew direxit

J. Hopwood sculp.



L. Baxter del. ad nat.

T. L. Pettigrew. direxit.

J. Hopwood. sculp.



BASIS OF THE BRAIN.

IN this Plate is represented the BASIS OF THE BRAIN, taken from a Boy about 10 years of age, its membranes and vessels removed, shewing the Origin of the CEREBRAL NERVES, the fibrous texture of them, the convoluted surface of the CEREBRUM, and the striated appearance of the CEREBELLUM.

- A. A. The Anterior lobes of the CEREBRUM, which rests on the Orbital processes of the Os Frontis.
- B. B. The Middle lobes of the CEREBRUM, which are contained in the Fossæ Cerebrales of the Temporal and Sphænoid bones.
- C. C. The Posterior lobes of the CEREBRUM, which are situated in the superior depressions of the Os Occipitis, resting upon the Transverse processes of the Dura Mater.
- D. D. The lobes of the CEREBELLUM, which lie in the inferior depressions of the Os Occipitis.
- E. E. The Lesser or superior lobes of the CEREBELLUM.
- F. F. F. F. The Convolutions of the CEREBRUM.
- G. G. G. G. The Intergyral spaces or hollows between the Convolutions into which the Pia Mater descends, and is called TOMENTUM CEREBRI.
- H. H. The Striæ of the CEREBELLUM.
- I. I. Part of the Middle lobes of the CEREBRUM; underneath which are the CRURA CEREBRI going to form part of the PONS VAROLII.
- K. K. The CRURA CEREBELLI which assist in the formation of the PONS VAROLII.
- L. The PONS VAROLII, or TUBER ANNULARE, which is opposed to the cuneiforme or basillary process of the Os Occipitis.

- m. The MEDULLA OBLONGATA, a continuation of the PONS VAROLII.
- n. The MEDULLA SPINALIS, divided as it passes into the Spinal Canal.
- o. o. The FISSURA MAGNA SYLVII, which is a sulcus dividing the anterior from the middle lobe, corresponding to the Ala Minor of the Os Sphænoïdes.
- p. The INFUNDIBULUM reflected forward leading to the PITUITARY GLAND.
- q. q. Part of the substance of the Middle lobe of the CEREBRUM, situated at the root of the Infundibulum, beneath which is the third Ventricle.
- r. r. The EMINENTIÆ CANDICANTES, *vel* CORPORA ALBICANTIA.
- s. s. The MONTICULUS VESALII.
- t. t. The CORPORA OLIVARIA, situated laterally on the MEDULLA OBLONGATA.
- v. v. The CORPORA PYRAMIDALIA, situated at the posterior part of the MEDULLA OBLONGATA, in this view appearing anteriorly.
- w. w. The CORPORA PYRAMIDALIA LATERALIA.
- x. The fissure in which is placed the FALX MAJOR, or superior longitudinal process of the Dura Mater, dividing the Hemispheres.
- y. The fissure in which is situated the posterior part of the FALX MAJOR, separating the Posterior lobes of the CEREBRUM.
- z. z. The fissures occasioned by removing the Transverse processes of the Dura Mater, dividing the CEREBRUM from the CEREBELLUM.
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1. 1. The First Pair, or NERVI OLFACTORII, passing upon the inferior surface of the anterior lobes of the Cerebrum.
2. 2. The Second Pair, or NERVI OPTICI, coming from the THALAMI NERVORUM OPTICORUM of the lateral ventricles.
3. 3. The Third Pair, or NERVI MOTORES OCULORUM, passing up by the anterior part of the PONS VAROLII, from the Crura Cerebri.
4. 4. The Fourth Pair, or NERVI PATHETICI, passing up on the anterior and lateral part of the PONS VAROLII.
5. 5. The Fifth Pair, or NERVI TRIGEMINI, arising from the PONS VAROLII, its fibrous texture is very apparent.
6. 6. The Sixth Pair, or NERVI ABDUCENTES, seen passing on the inferior part of the PONS VAROLII: its fibrous structure is likewise seen.

7. 7. The Seventh Pair, or NERVI AUDITORII, coming from the PONS VAROLII, the two distinct parts of which they are composed is very evident.
8. 8. The Eighth Pair, or NERVI VAGI, seen arising by a great number of filaments, posteriorly and laterally from the CORPORA OLIVARIA et MEDULLA OBLONGATA.
9. 9. The Ninth Pair, or NERVI MOTORES LINGUÆ, seen taking their origin by a number of fibres which form into two *fasciculi* from between the Corpora OLIVARIA et PYRAMIDALIA, to pass through the FORAMINA CONDYLOIDEA ANTICA.
10. 10. The NERVUS ACCESSORII SPINALIS WILLISII, passing up from the MEDULLA SPINALIS over the CEREBELLUM, and attached to the eighth Pair.
- a. The Line of Division between the CORPORA PYRAMIDALIA.
- b. b. b. The Striæ of the PONS VAROLII.
- c. A Sulcus, situated between the CORPORA ALBICANTIA AND PONS VAROLII, denominated FORAMEN CÆCUM ANTERIUS.
- d. A Sulcus, formed between the PONS VAROLII and MEDULLA OBLONGATA, called FORAMEN CÆCUM POSTERIUS.
- e. e. e. The three distinct bands by which the NERVI OLFACTORII arise.
- f. f. The expansion of the NERVI OLFACTORII before they send off filaments to pass through the Foramina Cribrosa of the Cribriform Plate of the Os Ethmoides.
- g. g. The origin of the NERVI OPTICI by the TRACTI OPTICI.
- h. h. Their union, which in the natural position of the Brain is situated somewhat anterior to the Sella Turcica.
- i. i. The Nerves divided at the part where they pass through the Foramina Optica.
- k. k. The NERVI MOTORES OCULORUM, cut through a little before their entrance into the Foramina Lacera Superiora.
- l. l. The NERVI PATHETICI divided in the same manner, before their entrance into the same Foramina.

- m. m. The NERVI TRIGEMINI cut through at the part where they perforate the Dura Mater.
- n. n. The NERVI ABDUCENTES *vel* MOTORES EXTERNI, divided previous to their penetrating the Dura Mater behind the posterior clinoid processes of the Os Sphænoides.
- o. o. The NERVI AUDITORII, cut through at their entrance into the Foramina Auditorii Interna.
- p. p. The Anterior part of the Seventh Pair, called PORTIO DURA.
- q. q. The Posterior part, or PORTIO MOLLIS.
- r. r. r. The different fibres by which the PAR VAGUM originates.
- s. s. The GLOSSO-PHARYNGEAL Branch of the Eighth Pair.
- t. t. t. t. The attachments of the SPINAL ACCESSORY NERVES to the PAR VAGUM.
- v. v. The NERVI MOTORES LINGUÆ, cut through at their entrance into the anterior Condylloid Foramina.
- w. The CINERITIOUS, or CORTICAL part of the MEDULLA SPINALIS.
- x. The fissure in which the FALX MINOR lies, dividing the CEREBELLUM into two lobes.



T. Baxter, del. ad nat.

T. Pettigrew, direxit.

J. Hopwood, sculp.



T. Baxter del. ad nat.

T. L. Pettigrew. direxit.

J. Hopwood. sculp.

BASIS OF THE CRANIUM.

IN this Plate is exhibited the BASIS OF THE CRANIUM (the Calvaria being removed) covered with its proper membrane the DURA MATER, its several processes, the Fossæ for the situation of the lobes of the BRAIN, the NERVES divided soon after their egress, and passing through the different FORAMINA OF THE CRANIUM.

- A. A. The Cut surface of the CRANIUM.
- B. B. The EXTERNAL Table or Plate of the Skull.
- C. C. The INTERNAL Table, or VITREA.
- D. D. D. D. The DIPLOE, which is of a cellular structure.
- E. E. E. E. The Protuberances of the CRANIUM which are received into the intergyral spaces of the CEREBRUM.
- F. F. The TEMPORAL BONE cut through in removing the CALVARIA.
- G. G. The FRONTAL, or PITUITARY SINUSES, which are divided by Osseous Septa.
- H. H. The ORBITAR PROCESSES of the Os Frontis, upon which the anterior lobes of the CEREBRUM are placed.
- I. I. The Fossæ CEREBRALES formed by the junction of the Sphænoid with the Temporal Bones in which the middle lobes of the CEREBRUM are situated.
- K. K. The superior depressions of the Os OCCIPITIS for the reception of the posterior lobes of the CEREBRUM.
- L. L. The inferior depressions of the Os OCCIPITIS for the lodgment of the lobes of the CEREBELLUM.
- M. The CUNEIFORME or BASILARY process of the Os Occipitis on which the PONS VAROLII et MEDULLA OBLONGATA are situated.

- n. The FORAMEN MAGNUM OCCIPITALE through which the MEDULLA SPINALIS enters the SPINAL CANAL (or more properly the *specus vertebrarum*) the ACCESSORY SPINAL NERVES and VERTEBRAL Arteries enter the CRANIUM.
- o. The CRISTA GALLI, proceeding from the cribriform plate of the Os Ethmoides which it divides into two, and to which the FALX MAJOR is very firmly attached.
- f. The PROCESSUS OLIVARIUS of the Os Sphænoides.
- a. a. The Anterior Clinoid Processes.
- r. r. The Posterior Clinoid Processes.
- s. s. The ALA MINOR, the sharp edge of which is received into the FISSURA MAGNA SYLVII, dividing the anterior from the middle lobe.
- t. t. The PROCESSUS PETROSUS Ossis Temporalis, covered by the DURA MATER.
- u. The SELLA TURCICA, in which the PITUITARY GLAND is situated. The Optic Nerves lie over it.
- v. v. The DURA MATER turned somewhat backward on the Orbital processes.
- w. w. The cut edges of the TENTORIUM, or TRANSVERSE processes of the DURA MATER.
- x. x. Part of the TENTORIUM on which the posterior lobes of the CEREBRUM rest.
- y. The FALX MAJOR, or superior longitudinal process of the DURA MATER cut and turned back.
- z. The FALX MINOR, or inferior longitudinal process of the Dura Mater, which divides the lobes of the CEREBELLUM, and is usually denominated the SEPTUM CEREBELLI.
- a. a. a. a. The fibres of the NERVI OLFACTORII passing through the foramina cribrosa of the cribriform plate of the Os ETHMOIDES.
- b. The NERVI OPTICI, situated over the SELLA TURCICA.
- c. c. The Nerves seen separating and passing through the FORAMINA OPTICA.
- d. d. The MOTORES OCULORUM, running through a sheath formed by the Dura Mater, in their passage to the Foramen Lacerum superius.
- e. e. The PATHETICI, passing on the side of the Motores Oculorum, entering the same sheath to pass through the same opening into the orbit.

- f. f. The TRIGEMINI perforating the Dura Mater at the anterior part of the Petrous process of the TEMPORAL BONE.
- g. g. The ABDUCENTES penetrating the Dura Mater behind the posterior clinoid processes of the Os SPHÆNOIDES.
- h. h. The NERVI AUDITORII, piercing the Dura Mater opposed to the Petrous process, and passing through the foramen communis nervorum.
- i. i. The ANTERIOR part, or PORTIO DURA.
- k. k. The POSTERIOR part, or PORTIO MOLLIS.
- l. l. The PAR VAGUM, perforating the Dura Mater to pass forwards to the FORAMEN LACERUM POSTERIUS.
- m. m. The GLOSSO PHARYNGEAL, a branch of the PAR VAGUM passing through a different opening in the Dura Mater superior to the one which the other part of this pair escapes by.
- n. n. The SPINAL ACCESSORY nerve passing up from the Spinal Marrow towards the PAR VAGUM to which it is attached, and entering the same Foramen.
- o. o. The MOTORES LINGUÆ, perforating the Dura Mater to pass through the Anterior Condylloid foramina.
- p. p. The SUB-OCCIPITAL nerves arising by two filaments from the superior part of the SPINAL MARROW.
- q. q. The SUB-OCCIPITAL, perforating the Dura Mater to pass between the OCCIPUT and first CERVICAL VERTEBRA.
- r. The MEDULLA SPINALIS separated from the MEDULLA OBLONGATA of which it is a prolongation.
- s. The CINERITIOUS matter in the centre of the MEDULLA SPINALIS.
- t. The cut surface of the Superior Longitudinal process of the Dura Mater.
- v. v. v. Protuberances of Bone corresponding to the Striæ of the PONS VAROLII.

